# UCPET MANUAL

1. INTRODUCTION

Thank you for choosing UCPET product from Allion Labs, Inc. USB Charging/ Protocol/ Electrical Tester (UCPET) is the automatic test equipment designed for USB Battery Charging Spec V1.2.

It also has been approved by USB-IF as standard test solution for USB Battery Charging V1.2.

UCPET can automatically implement the test categories of USB BC1.2 to verify if your product meets the specification requirements. With features of easy-to-use manual setting and software for oscilloscope usage, UCPET is able to assist you pass through USB BC1.2-related product development, debugging and validation.

2. HARDWARE INSTALLATION

2.1 Open the box

First, please check items inside UCPET packing box, which includes:

1. One UCPET Tester
2. One 12V@2.08A Voltage Adapter
3. One Power Cord
4. One Special Test Cable A (Micro-B plug to Micro-B plug)
5. One Special Test Cable B (Micro-B plug to Standard-A plug)
6. One Special Test Cable C (9-pin D-type Assembly, Y-Cable)
7. One Special Test Cable E (Micro-A plug to Standard-A receptacle)
8. One USB 2.0 A to B 2M Cable
9. One Signal Output Board
10. One Installation Driver CD
11. One Warranty Card

2.2 UCPET Port

UCPET's front panel as in picture 2-1:

Picture 2-1

- LED sign

  On the front panel, there are Power and Status LEDs showing the present working status of UCPET

  Power: When UCPET is powered and under testing mode, Power LED will show green light; if UCPET is under DFU mode, Power LED will show red light.

  Status: When UCPET connected to Host PC, the Status LED will show green light; When UCPET disconnected, Status LED is off.

- Test Port

  Test Port is a micro-USB AB-typed plug. It connects to UUT through Special Test Cable (A, B or C). CAUTION: Test Port's maximum continuous current is 1.5A.

- ACA Port

  ACA Port is a DB9-Female typed connector. When testing ACA-related equipment, ACA Port helps Test Port to connect with UUT through Special Test Cable C.

  See the list below for the definition of ACA Port. For more information please see USB Battery Charging 1.2 Compliance Plan Revision 1.0.

| ACA Port | Purpose |
|---|---|
| Pin 1 | Cable Sense |
| Pin 2 | Accessory Vbus |
| Pin 3 | Accessory ID |
| Pin 4 | GND |
| Pin 5 | Charger Vbus |
| Pin 6 | Charger D- |
| Pin 7 | Charger D+ |
| Pin 8 | OTG Vbus |
| Pin 9 | OTG ID |

- Signal Output

  Signal Output port is used to extract the main test signal, assisting in using oscilloscope or universal meter for measuring.

  See the list below for the definition of Signal Output:

| Signal Output | Purpose |
|---|---|
| Pin 1 | GND_UCPET |
| Pin 2 | GND_UCPET |
| Pin 3 | DP |
| Pin 4 | DM |
| Pin 5 | GND_UUT |
| Pin 6 | VBUS |
| Pin 7 | I_SINK |
| Pin 8 | I_SOURCE |
| Pin 9 | GND_UUT |

UCPET's rear panel as in picture 2-2:

Picture 2-2

- Host

  This is an USB Standard B receptacle. UCPET communicates with Host PC through the Host.

- DFU

  When UCPET needs firmware upgrade, press this button then power up. For specific information please see 5.4.

- DC12V

  UCPET's input voltage has to be 12V@2.08A, which matches to UCPET as an exclusive switching power supply.

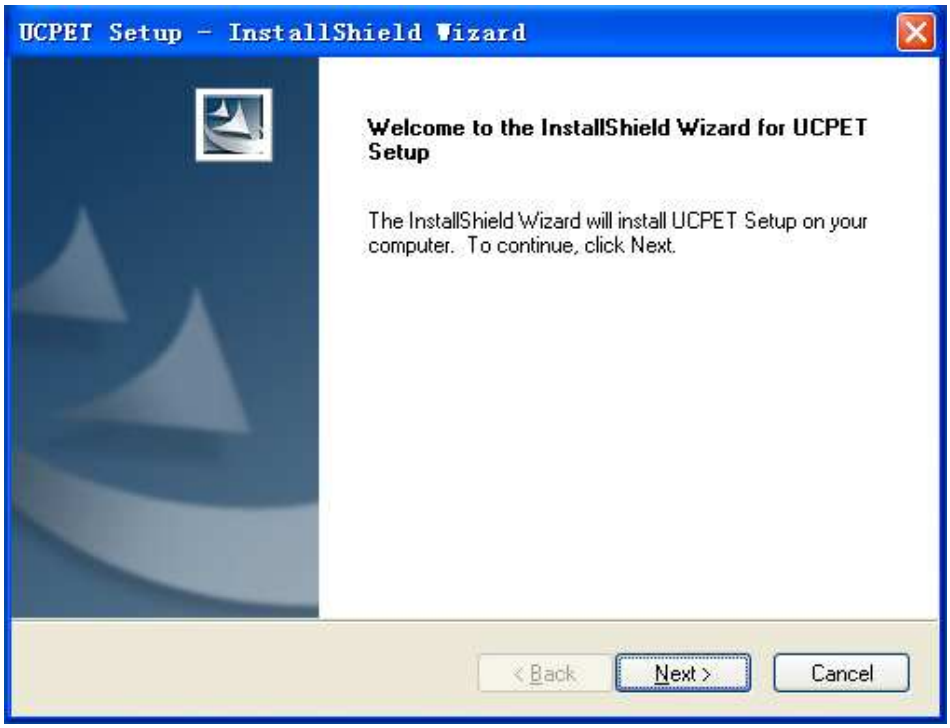
## 3. SOFTWARE AND DRIVER INSTALLATION

UCPET Software support OS: Windows XP / 7 (32bit / 64bit)

### 3.1 Installation Process

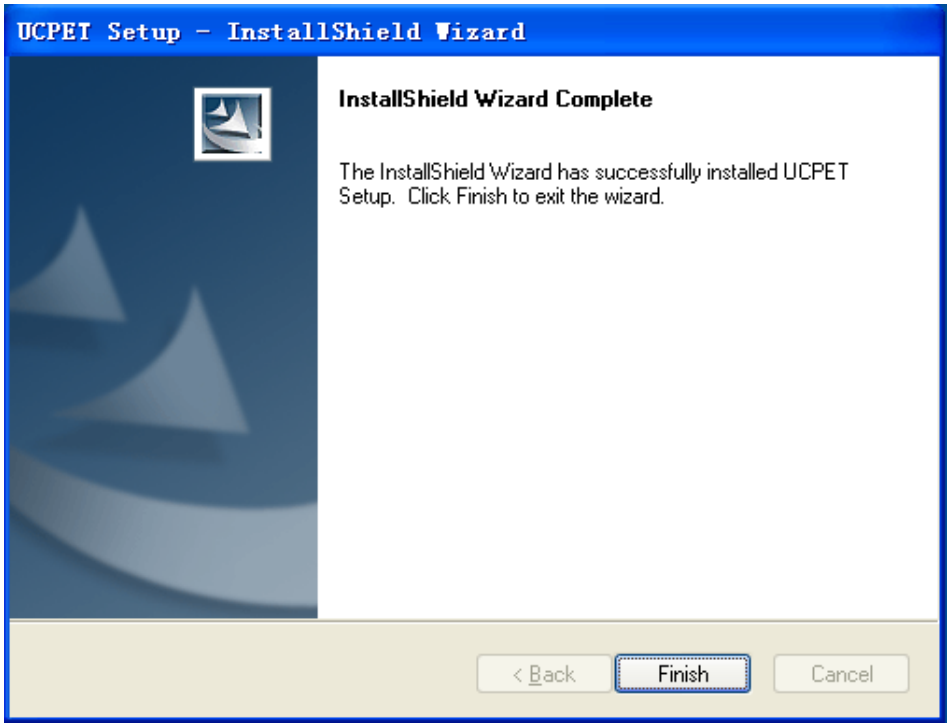
※ Please do not connect UCPET to Host PC before software installation. After software installation completed, please connect UCPET to Host PC to finish UCPET driver installation.

Once begin installation process, it will show interface as in picture 3-1.


UCPET Setup - InstallShield Wizard
Welcome to the InstallShield Wizard for UCPET Setup
The InstallShield Wizard will install UCPET Setup on your computer. To continue, click Next.
< Back
Next >
Cancel

Picture 3-1: Software Installation Popup Window

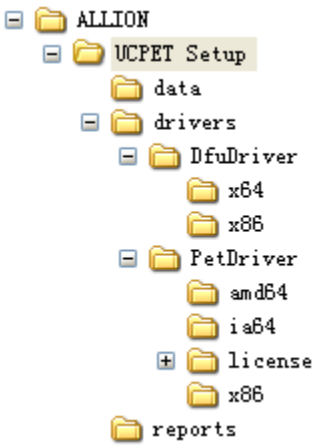
User follows suggestions and chooses appropriate option. By clicking “Next” step by step, installation will be finished. If installation is correct, you will see the last popup window, as in picture 3-2.


UCPET Setup - InstallShield Wizard
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed UCPET Setup. Click Finish to exit the wizard.
< Back
Finish
Cancel

Picture 3-2: Software Installation Finish Popup Window

- Directory Structure After Installation

  After installation, you will see the software installation directories:

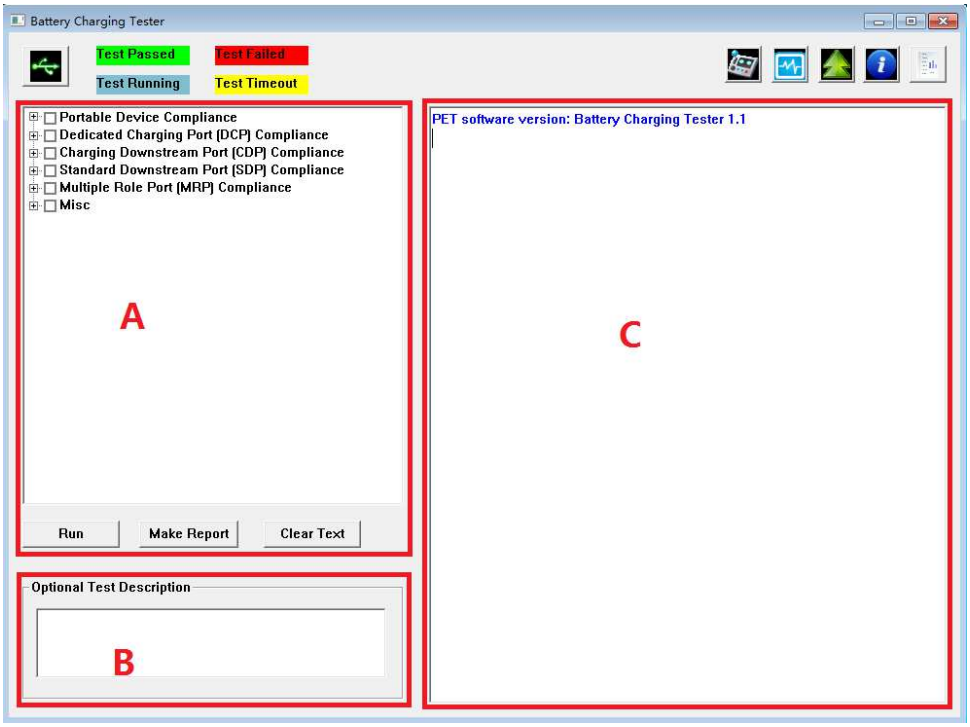



Picture 3-3: Directory structure after installation

There is installation driver for software use under “drivers” directory. When UCPET’s driver doesn’t install correctly, user can use windows installation driver guide to appoint installation driver’s directory as under the directory of “PetDriver”, which would complete the process of installation. Besides, “DfuDriver” is the installation driver when UCPET is under DFU mode.

4. OPERATION

4.1 Main Procedure Interface




Picture 4-1

Picture 4-1 shows the main procedure interface of UCPET.

UCPET's first purpose is to operate corresponding automatic test according to the test item definition of USB BC 1.2 Compliance Plan rev 1.0. Therefore, the main procedure interface of UCPET is also designed in accordance with this purpose.

Zone A, on the upper left side in picture 4-1, indicates select zone for test item of BC compliance. User can choose at least one set or more according to the types and test needs of UUT.

Zone B, on the lower left side in picture 4-1, is the test description zone. According to requirements, user can text here to describe up-coming test. These messages would be saved in report file.

After choosing test item, user can click "Run" and UCPET would operate tests successively according to selected test items.

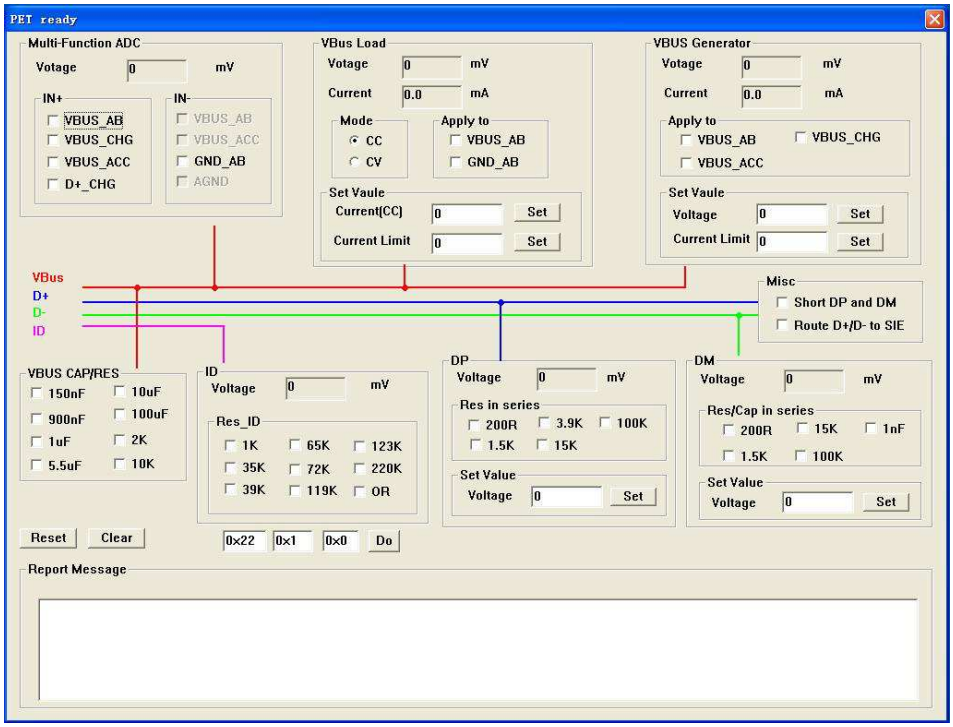
When test begins, test steps, result and other information would be showed up in Zone C, the right side in picture 4-1. By clicking "Clear Text", user can delete all messages.

If test is finished, user can click "Make Report" and save Html format report.

4.2 Manual Operation

User can use Manual Operation function to conduct UCPET directly. Under this mode, UCPET can imitate DCP, CDP, SDP and etc. User can also turn on software oscilloscope at the same time, observing Vbus, D+, D- and current signal waveform.

Click the upper right icon on main procedure interface to access Manual Operation interface, as in picture 4-2:




Picture 4-2

Divided by function, Manual Operation interface can be separated into 8 parts:

1. Muti-Function ADC

   User can choose five different observation objects, including VBUS_AB, VBUS_CHG, VBUS_ACC, D+_CHG and GND_AB from single option box. The result unit would be millivolt and value would be positive integral.

2. Vbus Load

This part can control UCPET's built-in electronic load: Voltage and Current boxes separately shows present built-in electronic load's voltage and input electronic load's current value. Indication range of voltage is 0-7500mV and current is 0.0-2500.0mA. There are two measuring ranges for current measurement, one is 0.0-200.0mA and one is 200.1-2500.0mA. Based on actual measured value, electronic load would automatically switch over.

Electronic load can work in constant current (CC) and constant voltage (CV) modes. User can switch through CC and CV radio button in Mode selection region.

According to choice box "Apply to" status, electronic load would load up to VBUS_AB or GND_AB, but cannot load up to VBUS_AB and GND_AB at the same time. In "Set Value" zone, user can separately set up electronic load's working current/voltage and maximum limit value. User only has to input value then click "Set" to execute.

Working current's effective value is integral number from 0 to 1500 and limit value's effective value is integral number from 0 to 1800. CAUTION: it is propositional that limit value is appropriately bigger than working current's value. For example, if user wants to have constant current of 1500mA, working current should be 1500 and limit value should be bigger than 1500, which may be set up from 1550 to 1800.

Propositional set up process (under CC mode): Since electronic load's loading is performed through electrical relay, it is suggested that user should follow steps below to use electronic load in case contact bounce:

a) Set current and current limit as 0

b) By choosing "Apply to" to make loading hit the intended target

c) Set current limit value (slightly bigger than current value) and perform

d) Set current value and perform

3. Vbus Generator

This part controls USPET's built-in NC power, which is used on Vbus: Voltage and Current boxes separately shows present voltage and exporting current value generated by Vbus Generator. Voltage indication range is from 0 to 7500mV and current indication range is from 0.0 to 2500.0mA. Electronic load would automatically switch over depending on actual measured value.

According to choice box "Apply to", power generated by Vbus Generator can be loaded to VBUS_AB, VBUS_CHG and VBUS_ACC. User can also stop loading Vbus Generator through this function.

In “Set Value” zone, user can separately set up output voltage and maximum limit value. During setting, input value first then click “Set”.

Voltage’s valid input is arbitrary integer from 2500 to 7500 and limit value’s valid input is arbitrary integer from 0 to 1800.

CAUTION: VBUS Generator can generate any voltage from 0 to7500mV. Since its three load switches are MOSFET, it is required to input voltage bigger than 2.5V. Therefore, VBUS Generator’s actual valid output voltage is from 2500 to 7500 mV.

4. Vbus CAP/RES

   This part controls UCPET’s loading of different values of capacitance and resistance in between VBUS_AB and GND_AB.

5. ID

   This part shows voltage value on ID_AB and also controls UCPET’s loading of different values of resistance in between ID_AB and GND_AB.

6. DP/DM

   This part shows voltage value on DP_AB/DM_AB and also controls UCPET’s build-in DAC_DP/DAC_DM to generate required voltage then imports to DP_AB/DM_AB by choosing different resistance.

   Voltage’s valid input is arbitrary integer from 0 to 3600. When setting DAC, it is necessary to input value first and then click “Set.”

7. Misc

   User can make UCPET’s internal DP_AB short-circuit with DM_AB by choosing “Short DP to DM”; or “Route D+/D- to SIE” to make DP_AB and DM_AB signal switch to SIE.

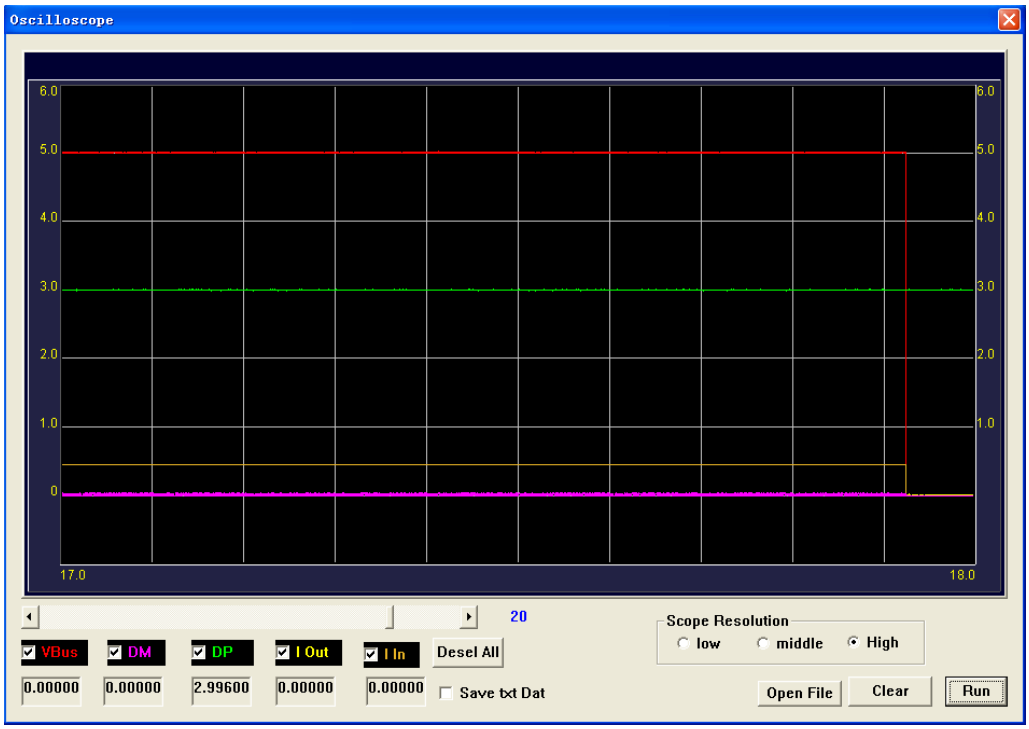
8. Message Display

   Report Message zone, which under Manual Operation interface is used to show status information of UCPET.

4.3 Soft Scope

When doing test or using Manual Operation, user can turn on Soft Scope for real-time observation of VBUS Voltage, VBUS Current, Load Current and the dynamic waveform and interrelation of DP and DM. Soft Scope can also preserve and replay gathered waveform data.

Click button, which is on the upper right side of Main Interface to open Soft Scope Interface as in picture 4-3:




Picture 4-1

On the lower left side of Soft Scope, user can choose signal that he/she wants to observe. Every signal's real-time value would be showed in the vis-à-vis choice box and the unit is voltage. If it's under default mode, five signals would appear at the same time.

Soft Scope is an easy-to-use observational tool but doesn't have Trigger and ZOOM. When it is under default mode, Soft Scope would keep recording all the waveform information and waveform would be scrolling-displayed. If user wants to observe past waveform, you can click "Pause", which in on the lower right side to stop gathering. Then browse the gathered waveform data through time scale, which is on top of signal choice box.

User can also click "Open File" to download bin-format waveform data document to browse.

When logging out Soft Scope interface, a dialogue box would show up, reminding whether to preserve current waveform data or not.

4.4 FW Updating

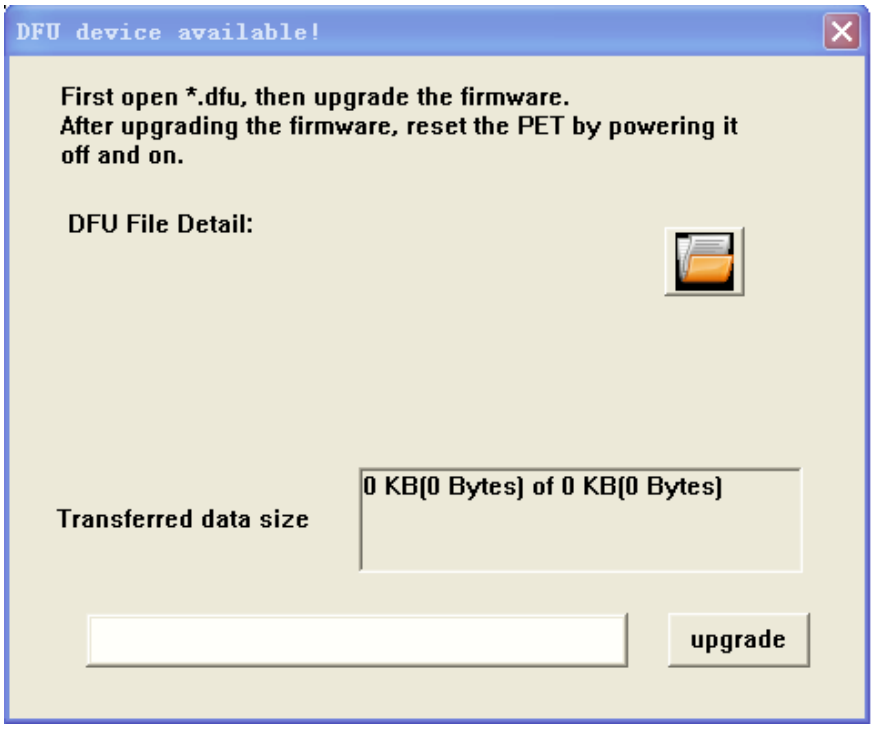
Since the entire test scripts are preserved in UCPET firmware, sometimes it is necessary for firmware to update. When updating firmware, user needs to have UCPET be under DFU mode.

Methods:

1. Disconnect UCPET's 12V power
2. Press DFU button on UCPET's rear panel and re-connect 12V power at the same time
3. At this moment, LED sign on UCPET's front panel would turn to red light, which means UCPET is under DFU mode

   Since UCPET in under DFU mode, hardware status picture in UCPET's software main interface turns to gray .

   Click button, which is on the upper right side if main interface to enter FW Updating interface as in picture 4-4:

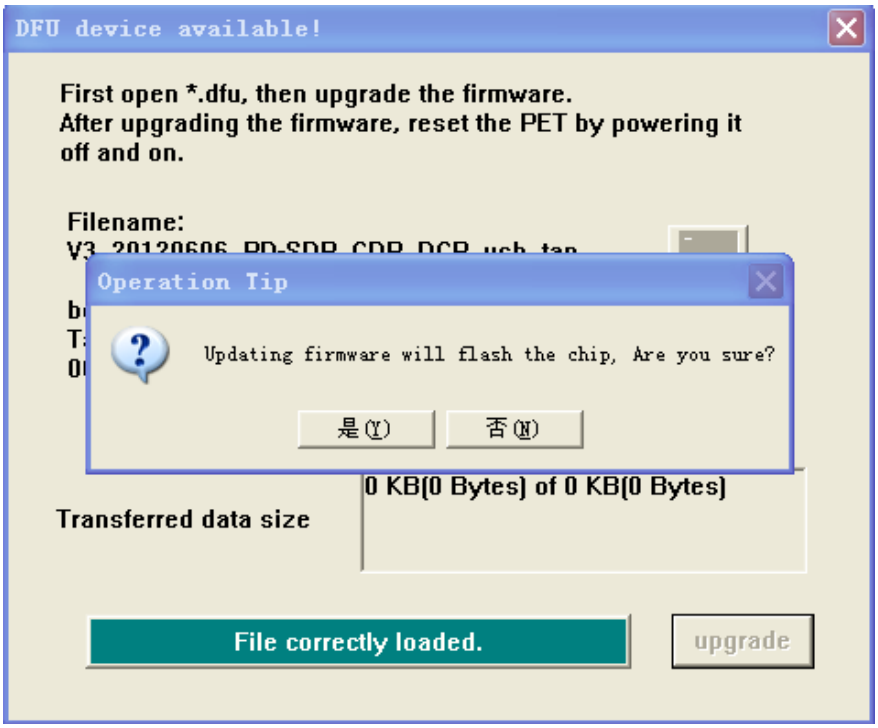

DFU device available!
First open *.dfu, then upgrade the firmware.
After upgrading the firmware, reset the PET by powering it off and on.
DFU File Detail:
Transferred data size
0 KB(0 Bytes) of 0 KB(0 Bytes)
upgrade

Picture 4-4

First, click button and choose DFU document as in picture 4-5:

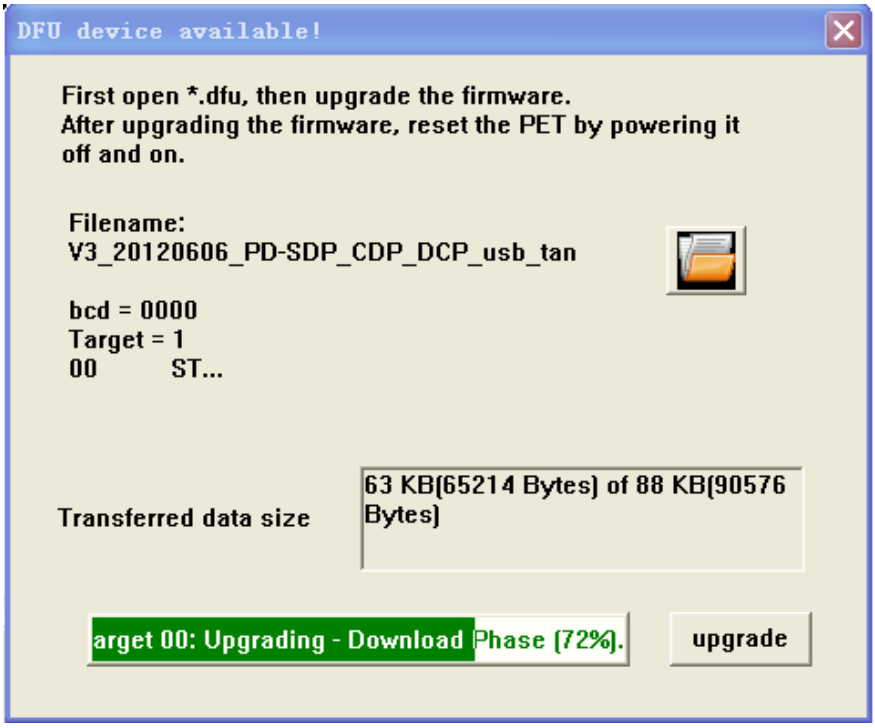
Picture 4-5

After choosing document, click “upgrade” button and the system would ask user whether to upgrade firmware as in picture 4-6:


DFU device available!
First open *.dfu, then upgrade the firmware.
After upgrading the firmware, reset the PET by powering it off and on.
Filename:
Operation Tip
Updating firmware will flash the chip, Are you sure?
是(Y)
否(N)
Transferred data size
0 KB(0 Bytes) of 0 KB(0 Bytes)
File correctly loaded.
upgrade

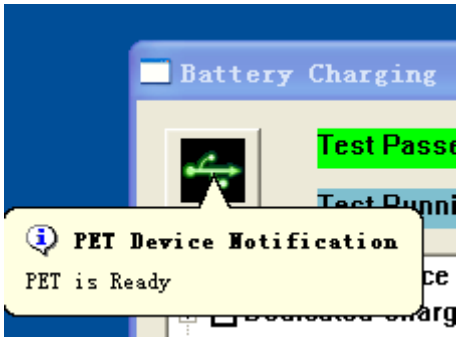
Picture4-6

After confirmation (Click Yes), it is in upgrading process as in picture 4-7:


DFU device available!
First open *.dfu, then upgrade the firmware.
After upgrading the firmware, reset the PET by powering it off and on.
Filename:
V3_20120606_PD-SDP_CDP_DCP_usb_tan
bcd = 0000
Target = 1
00 ST...
Transferred data size
63 KB(65214 Bytes) of 88 KB(90576 Bytes)
arget 00: Upgrading - Download Phase (72%).
upgrade

Picture 4-7

After finishing upgrade, please restart power recycle then UCPET is ready for use. The status icon on main interface would be green, representing the success of upgrade as in picture 4-8:



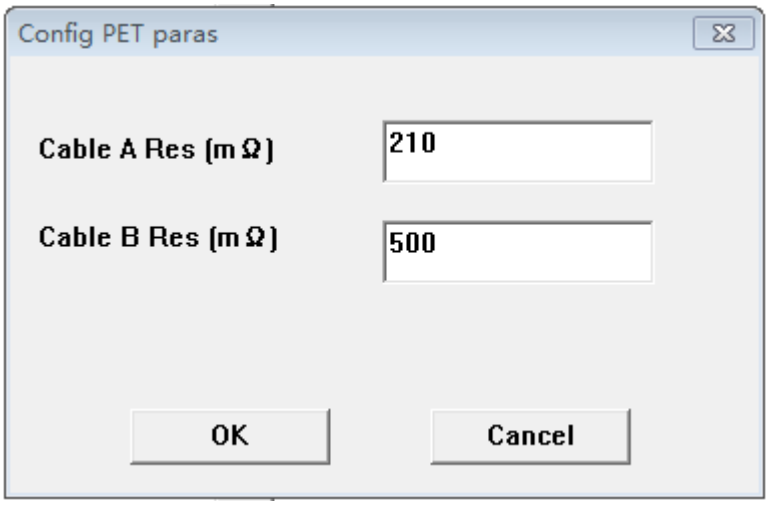

Picture 4-8

4.5 Cable Resistance Value Settings

Some of test items will have high VBUS current pass through USB test cable. The cable resistance (mΩ) might cause voltage drop and effect test result.

Considering reducing cable resistance affected. User may need to input correct USB cable resistance value before testing. UCPET will help to correct and accuracy test result based on this value.

Click button, the dialog will shown as in picture 4-9:




Picture 4-9

Please input the values that printed on label of USB cables, then click OK.

This values will saved in UCPET Flash memory and no need to re-setting next time.

## Sales Contact Information:

Allion Labs, Inc.

www.allion.com

+886-2-77228800 E-mail: service@allion.com

## Technical Support:

If you have any question regarding to Allion UCPET, please send mail to

UCPET_Support@tmc-allion.com

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